Rev 1.03 Jan 2005

Refrigerant Detection System

Installation Manual

Preliminary copy

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SECTION 1 : BRIEF DESCRIPTION OF PARTS

1.1 IRLDS Analyser Panel

Part Number :	885400-006	8 channel Freon Analyser
	885400-111	8 channel Ammonia Analyser
	885400-004	16 channel Freon Analyser
	885400-110	16 channel Ammonia Analyser

The Analyser panel is the main part of the refrigerant detection system. The panel is available with either 8 or 16 channels and can be fitted with an infrared bench for either standard CFC, HCFC or HFC refrigerants or an infrared bench for ammonia. Each panel is fitted with a pump to draw air samples back from each sampling location to the infrared bench and a waterbowl with a float switch to protect the panel in case of accidental ingress of water into the sampling tube.

1.2 Coldroom Refrigerant Leak Alarm Panel

1.2.1 Type 1

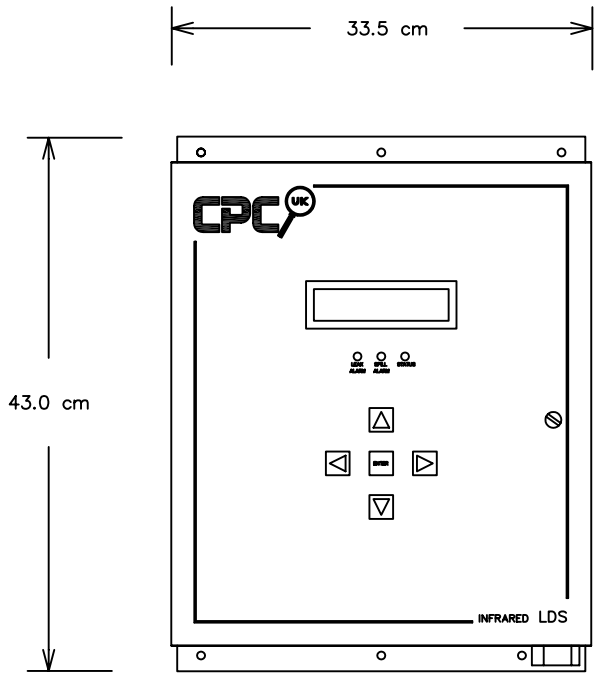
Part Number :	000-070	8 output channels
	000-080	16 output channels

The Coldroom Refrigerant Leak Alarm panel type 1 is designed for use on either a stand alone refrigerant detection system or a system connected to a third party BMS or refrigeration alarm panel. It is available with either 8 or 16 outputs and will provide 24Vdc through individual channels as switched by the analyser panel.

1.2.2 Type 2

Part Number :	000-010	7 output channels
	000-020	15 output channels

The Coldroom Refrigerant Leak Alarm panel type 2 is designed for use specifically with a refrigerant detection system connected to a CPC Einstein refrigeration alarm panel. It is available with either 7 or 15 ouputs and will provide 24Vdc through individual channels as switched by the Einstein panel.

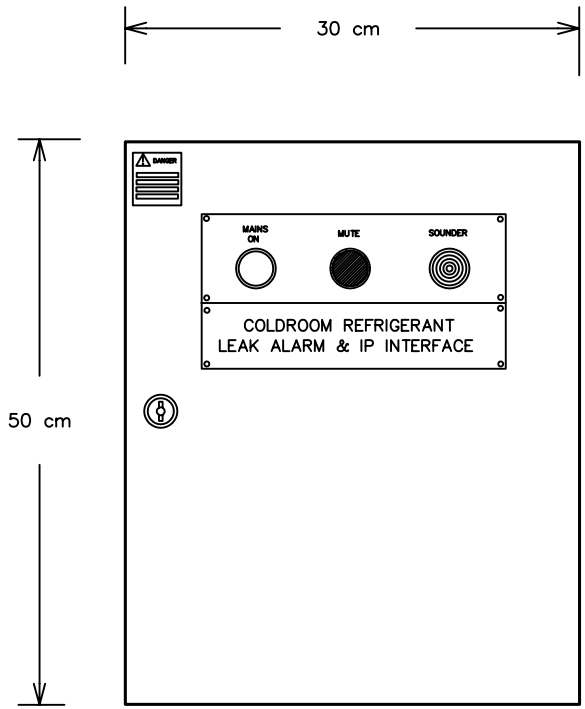


(Depth: 15.5 cm)

IRLDS – InfraRed Leak Detection System

Analyser Panel

(PT NO. 885400–006 / 8 Ch Freon
PT NO. 885400–111 / 8 Ch Ammonia
PT NO. 885400–004 / 16 Ch Freon
PT NO. 885400–110 / 16 Ch Ammonia)

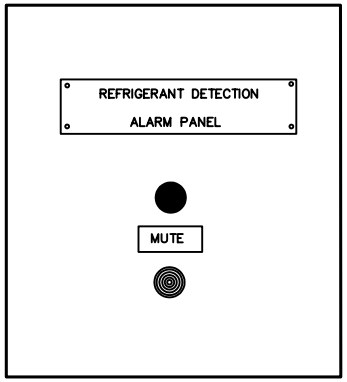


(Depth: 14 cm)

Coldroom Refrigerant
Leak Alarm Panel

Type 1

(PT NO. 000–070 / 8 Output Chs
PT NO. 000–080 / 16 Output Chs)



Coldroom Refrigerant
Leak Alarm Panel

Type 2

(PT NO. 000–010 / 7 Output Chs
PT NO. 000–020 / 15 Output Chs)

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Title	Analyser & Strobe Interface Panels
Site	
Drg. No.	CPC 80000–01
Date 27.04.04	Drn. By ALB
Checked	

Revisions

1.3 Filters

1.3.1 Inline Filter

Part Number : 272-0621

The Inline Filter is fitted with a fine filtration element and is used to prevent the ingress of dust particles, etc. into the analyser panel. The inline filters are fitted underneath the analyser panel and a separate filter is used for every sampling channel that is occupied on the analyser panel.

1.3.2 End of Line Filter

Part Number : 44-5100

The End of Line Filter is fitted with a slightly coarser filtration element than the inline filter and is used to prevent the ingress of dust and dirt particles into the sampling tube. End of line filters are fitted at each open end of tube local to the sampling locations that are to be monitored.

1.4 Manifolds

1.4.1 2 Way Manifold

Part Number : 44-5102

The 2 Way Manifold is a Y-piece that is used to split the sampling tube for a single channel into 2 ends to provide a local spread of sampling close to the required sampling location (ie. to enable a single sampling channel to be used to measure from both the left hand and right hand side of a multi-compressor pack without using a second sampling channel).

1.4.2 3 Way Manifold

Part Number : 44-5103

The 3 Way manifold is used to provide further localised spread of sampling than the 2 Way manifold above.

1.4.3 4 Way Manifold

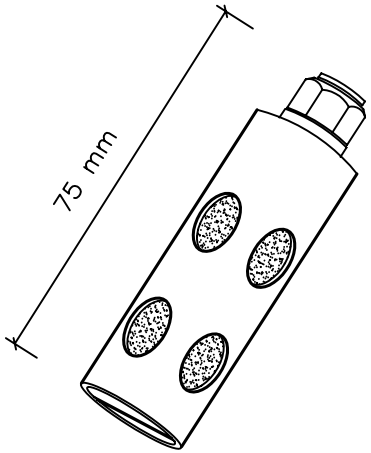
Part Number : 44-5104

The 4 Way manifold is used when further localised spread of sampling is required than 2 or 3 points. As the air flow is reduced down each single point of the 4 way manifold (approximately one quarter of the air flow through the main sampling tube) we do not recommend splitting the sampling channel into any more than 4 points.

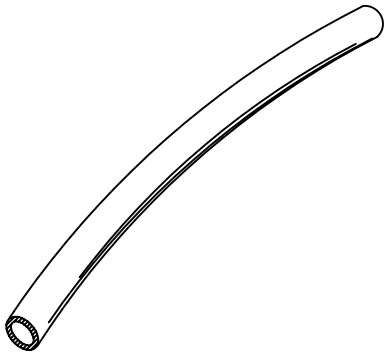
1.5 Sampling Tube

Part Number :	44-5201	Dark Blue
	44-5202	Red
	44-5203	Yellow
	44-5204	Dark Green
	44-5205	Dark Brown
	44-5206	Black
	44-5207	Natural (Clear)
	44-5208	Orange
	44-5209	Pink
	44-5210	Grey
	44-5211	Light Brown
	44-5212	Violet
	44-5213	Light Green
	44-5214	Gold
	44-5215	Beige
	44-5216	Light Blue

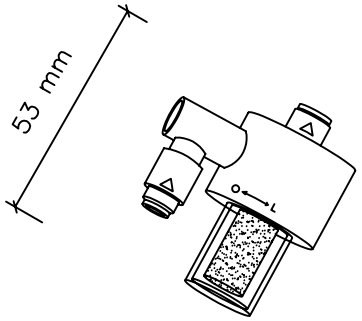
The sampling tube is used to carry the air samples from the sampling locations back to the analyser panel. The tubing is supplied in 16 separate colours to make each channel easily identifiable (last 2 digits of part number indicate standard channel number). The tubing is made from plastic and is 6mm outside diameter for easy use with the push fit connections on the filters and manifolds.



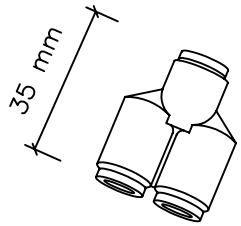
End–of–line Filter
(PT NO. 44–5100)



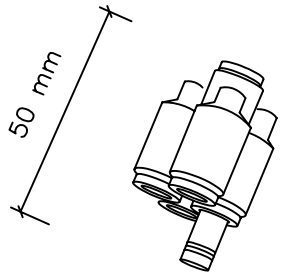
6 mm O/D Sampling Tube
(PT NO. 44–52**)



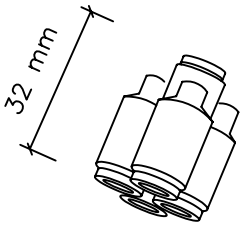
In–line Filter
(PT NO. 272–0621)



2 way Manifold
(PT NO. 44–5102)



3 way Manifold
(PT NO. 44–5103)



4 way Manifold
(PT NO. 44–5104)

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Title
Filters, Manifolds, Sampling Tube

Drg. No.	CPC 80000–02	Revisions
Date 26.04.04	Drn. By ALB	
Checked		

1.6 Other Fittings

1.6.1 Vent Line Fitting

Part number : 44-5100-3

The vent line fitting is used for terminating sampling tube into a steel vent pipe. The pipe will need to be drilled and tapped to receive the threaded end of the fitting and the 6mm push fit collar at the other end will receive the sampling tube. Full details for terminating sampling tube into vent pipes including copper materials are explained further on.

1.6.2 Straight Connector

Part number : 44-5101

The straight connector is used for joining 6mm tube to 6mm tube. It can be used for joining plastic tube with copper tube when required or simply to repair damaged tube.

1.6.3 Filter Bracket

Part number : 44-5111

The filter bracket is used to neatly clip the end of line filters firmly at the required sampling location. The bracket is screwed to the framework, wall, ceiling, etc. and a spring clip holds the filter in place.

1.6.4 Warning Beacon

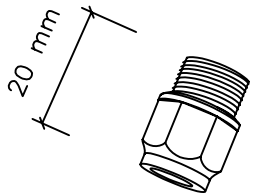
Part number :	44-309-5922	Red
	44-312-5376	Blue

The warning beacons are used together with the coldroom refrigerant leak alarm panels to provide local warning to personnel of refrigerant leaks.

1.6.5 Lampshade Collector

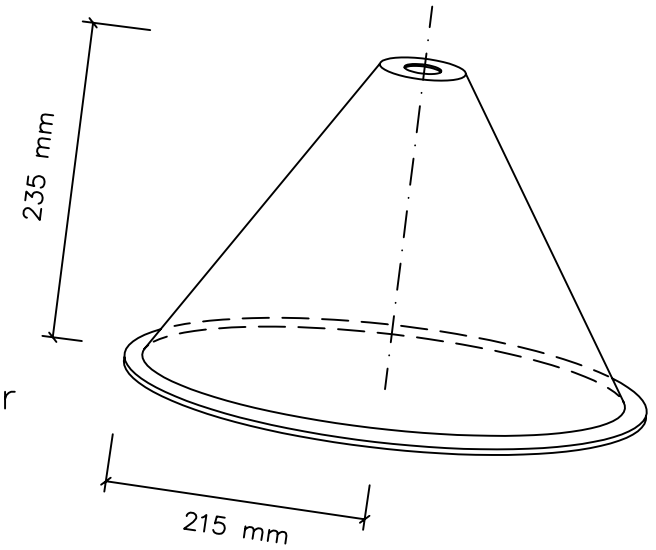
Part number : 45-1000

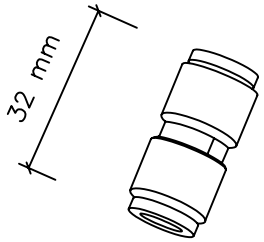
The Lampshade Collectors are used when the gas being monitored is lighter than air such as ammonia. The collector allows the end of line filter to be fitted at a lower level if the ceiling is high making installation and maintenance easier without fear of missing gas leaks.



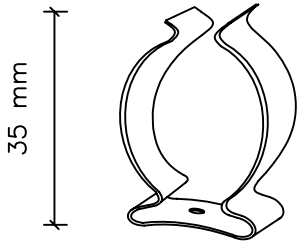
Vent line
(PT NO. 44–5100–3)

Lampshade collector
(PT NO. 45–1000)

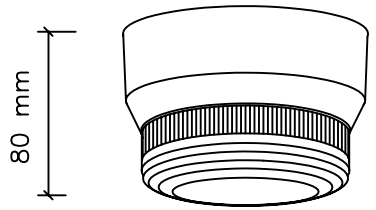




Straight connector
(PT NO. 44–5101)



Filter bracket
(PT NO. 44–5111)



Beacon
(PT NO. 44–309–5922 Red
PT NO. 44–312–5376 Blue)

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Title
Other fittings

Drg. No. CPC 80000–03
Date 27.04.04 Drn. By ALB
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Revisions

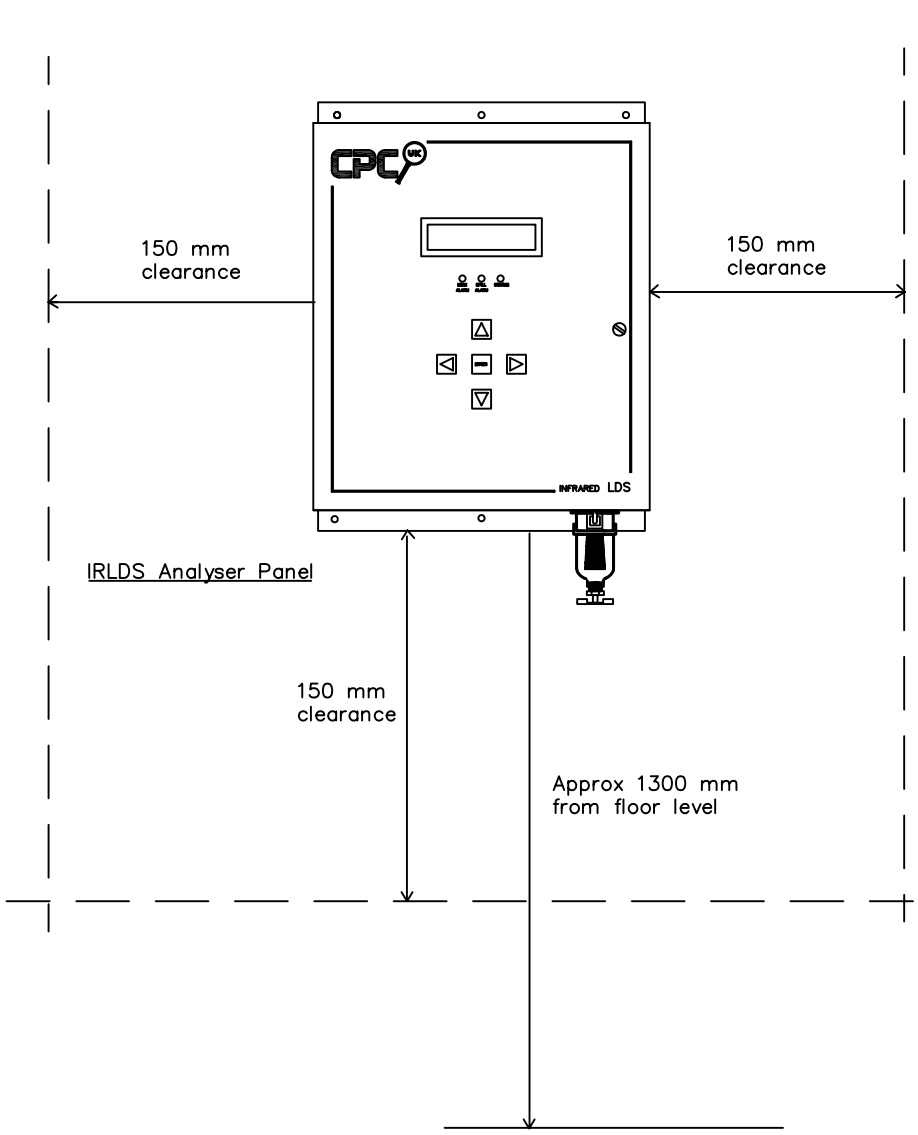
SECTION 2 : CHOOSING PANEL POSITIONS

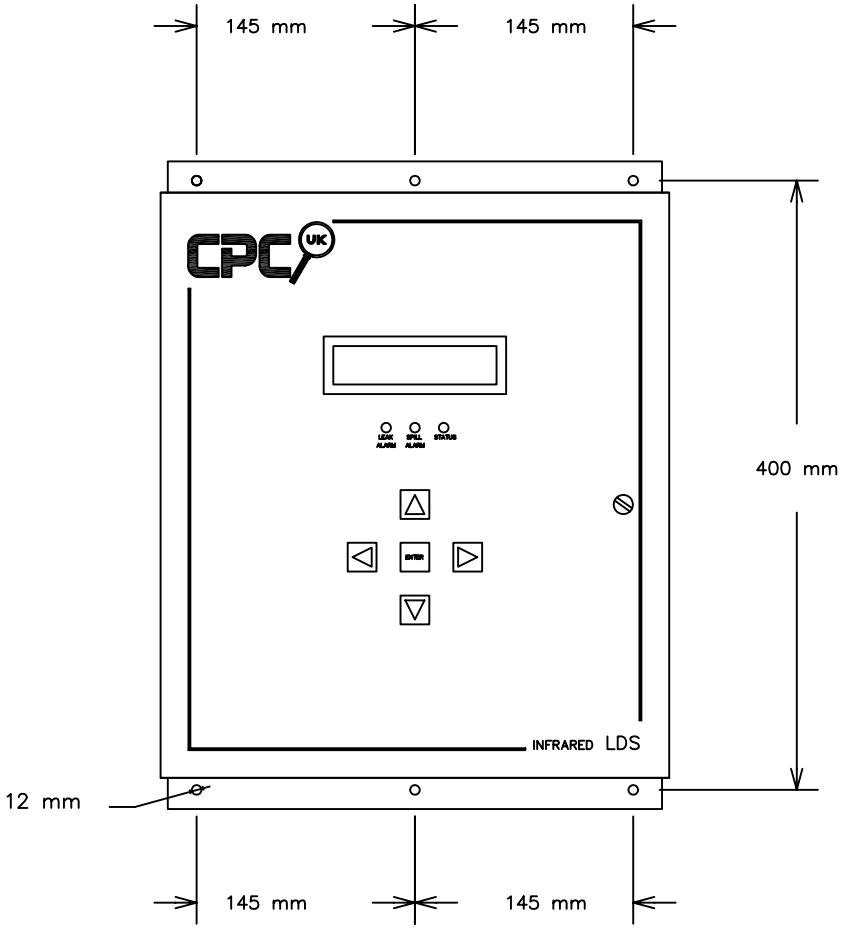
2.1 IRLDS Analyser Panel Location

The main points to think about when choosing the analyser position are as follows:-

1) Keep the majority of sampling tubes to the minimum length
2) Easy access for power and communications wiring
3) Accessibility for viewing and acknowledging alarms
4) Possibility of damage
5) Operational noise

Although the sampling tubes can be run in excess of 150 metres for a single channel it is advisable to keep lengths to a minimum to ensure low pressure drops, good air flow and minimum sampling and cycle times during sequential sampling. As there are up to 16 sampling tubes connected to an analyser panel it is best to position the panel central to the majority of the sampling locations being monitored. The analyser panel will require mains power to operate and thought must be given to accessibility for electrical services and communications network wiring to the panel position. The panel will need to be manually reset in case of alarm and thought must be given to accessibility to the panel for site personnel. In some cases the panel may be mounted so that site personnel can view alarms prior to entering a room containing harmful gases. Analyser panels employed to monitor for ammonia and explosive gases should be mounted in areas with no possibility of the gas being leaked into. The panel should be mounted with the display at eye level so that personnel do not have to bend low or climb ladders when viewing data or alarms. Thought should also be given to the possibility of damage to the panel if mounted in busy corridors, etc. If the panel must be mounted in busy areas it is advisable to place protection such as a key clamp to prevent accidental damage. The final consideration should be given to the operational noise of the panel; it is not advisable to mount the panel in quiet office areas where the background noise of the pump in the panel may cause disturbance to site personnel.





UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title: Mounting Analyser Panel

Site:

Drg. No. CPC 80000–04

Date 27.04.04 Drn. By ALB

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1		

2.2 Coldroom Refrigerant Leak Alarm Panel Location

The coldroom refrigerant leak alarm panel, as it's name suggests, was predominately designed to initiate warning beacons over the door to individual walk in freezers and coldrooms in the event of a refrigerant leak being detected in that particular coldroom. It is therefore advisable to mount the panel in close proximity to the coldroom areas in order to minimise the cable lengths to the individual beacons for ease of installation. As with the analyser panel, thought should be given for access to the panel for power and communications network wiring. The panel is fitted with a buzzer and has a mute button on the door; therefore the panel should be mounted within easy reach for site personnel to press the mute button when required.

SECTION 3 : CHOOSING END OF LINE POSITIONS

The main points to think about when choosing end of line sampling positions are as follows:-

1) Most likely points of leakage
2) Areas containing highest gas volumes
3) Protection of personnel
4) Density of gas being monitored
5) Air flow around sampling location and possible collection point

Obviously, the main areas for placing gas detection are the points with the highest possibility of leakage. Mechanical parts such as valves and compressors and parts undergoing compression and expansion through pressure or heat have a greater tendency to leak. Areas containing the largest gas volumes in a system should also be given high consideration as these have the potential to leak the highest volume. Working areas with personnel operating within may need consideration in order to prevent the possibility of toxic fumes causing any harm.

The positioning of the end of line filters within the sampling location is important as an incorrectly placed filter may cause delay in sensing a leak or may cause the analyser panel to draw back unwanted substances. The density of the gas being monitored is an important factor in choosing filter positions; heavier than air gases will obviously fall towards the floor whilst lighter than air gases will rise towards the ceiling. Extract fans and louvres will tend to draw the air from a room and consideration should be given to which way the air may be flowing across the particular point being monitored to ensure that the leaking gas is pulled towards the filter rather than away from it. A final consideration should be given to the possibility of liquids and other unwanted substances being drawn into the sampling lines; end of line filters should not be placed directly into areas with the possibility of liquid falling onto them and filters should be fitted at least 50mm above floor level to prevent them falling into puddles, etc.

SECTION 4 : INSTALLATION SCHEDULE

Most CPC detection systems will be supplied together with an installation schedule. The unit number at the top left hand side of the schedule differentiates between analyser panels in the event of more than one panel being used on a single site. Other information at the top of the sheet includes the CPC customer name, contract (quote) number, the date that the schedule was written and the site name where the equipment is being installed.

The table on the schedule has 7 labelled columns giving information as follows:-

1) Channel Reference – this indicates the channel number that the sampling point will be connected to on the analyser panel.
2) Location – this indicates the area or zone to be monitored from.
3) No. of points – this indicates whether a 2 way, 3 way or 4 way manifold is required. 1 point indicates that no manifold is required.
4) Distance Run – this indicates the length in metres of the main tube run between the analyser panel and the sampling location.
5) Distance Legs – this indicates the length in metres of each single leg between the manifold and the end of line filter. Generally this is less than 5 metres.
6) Tube Colour – this indicates which colour tube is assigned to each particular sampling location. The last 2 digits of the part number printed on each tube indicate the channel number that the tube is generally used for (ie. dark blue tube is channel 1, etc.).
7) Comments – this is for any special relevant information that may be required to assist the installation engineer.

Care should be taken to follow the details on the installation schedule as closely as possible as in many instances sampling tubes are measured and cut to exact lengths. Any changes made at site may result in tubes being too short resulting in connectors and additional tube needing to be supplied.

Unit 1

Installation Schedule

Customer: *Customer* **Engineers Name :-**

Quote Ref :DP *Contract Number*

Date:- **27/04/04** **Date :-**

Site:- *Site Name*

Chan. Ref.	Location	No Of Points	Distance		Tube Colour	Comments
			Run	Legs		
1	Compressor Pack 1	4	25	3	Dark Blue	
2	Compressor Pack 2	4	25	3	Red	
3	Compressor Pack 3	4	30	3	Yellow	
4	Compressor Pack 4	4	30	3	Dark Green	
5	Coldroom 1	2	40	3	Dark Brown	
6	Coldroom 2	2	40	3	Black	
7	Coldroom 3	3	30	5	Natural	
8	Coldroom 4	3	30	5	Orange	
9	Main Refrigeration Riser	2	40	2	Pink	
10	Salesfloor Area 1	1	75		Grey	
11	Salesfloor Area 2	1	75		Light Brown	
12	Salesfloor Area 3	1	100		Violet	
13	Salesfloor Area 4	1	100		Light Green	
14	Air Handling Unit	2	50	2	Gold	
15	Condenser 1	2	50	2	Beige	
16	Condenser 2	2	50	2	Light Blue	

SECTION 5 : INSTALLING SAMPLING TUBE

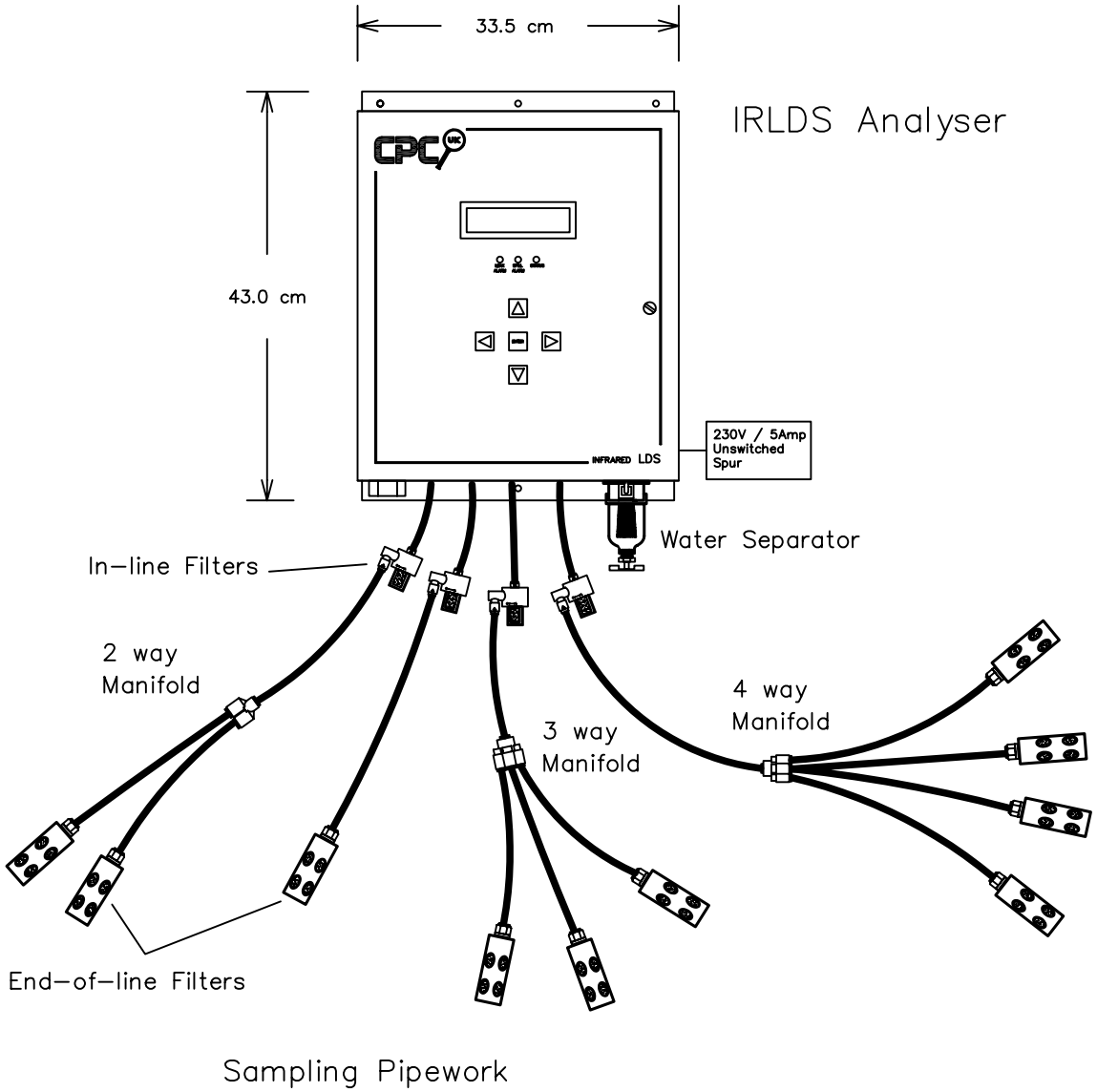
5.1 Main Tube Run

The main considerations when installing the 6mm sampling tube are to keep it tidy, inconspicuous and not to squash or kink it. The tube can be ran on cable tray, pipework, steel beams or in trunking or conduit and appropriate fixings should be used such as cable tie wraps, insulation tape, pipe clips or purling clips. The main tube runs should be fixed approximately every 1.5 metres to prevent them sagging or working loose, however, care should be taken not to over tighten any fixings which may result in crushed or damaged sampling tubes. Tight bends should also be avoided as this will probably cause the tubing to kink and give flow fault alarms when the analyser panel is switched on; large radius curves should be used when the tube run needs to change direction. Main tube runs should be taped at each end until the final filters are fitted to prevent dirt getting into them.

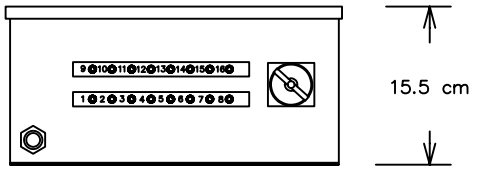
Thought should be given to ensure that the tube is not installed in areas that may cause long term damage to it or be a nuisance to maintenance contractors. Tubes run along hot pipes or close to moving parts run the risk of being melted or worn and tubes fixed to mechanical parts such as compressors may impede maintenance work.

5.2 Manifolding

The main sampling tube run will connect the analyser panel to the required sampling location. If the sampling location does not require a localised spread of sampling then a single end of line filter will be fitted at the sampling location end of the tube. The sampling tube should have a neat cross sectional cut at the end to ensure a good connection when fitting the push fit end of line filter. Where a further spread of sampling is required such as a large multi-compressor pack having several points fitted underneath the compressors either a 2 way, 3way or 4 way manifold will be fitted. The single exit of the manifold will be fitted to the end of the main sampling tube run leaving the multiple exits for the sampling legs. Each sampling leg from the same manifold should be of equal length and should not exceed 5 metres in length in order to keep identical air flows through each leg and pressure drops to a minimum.



Sampling Pipework



Connection Details

CHANNEL		TUBE COLOUR
1	---------	DARK BLUE
2	---------	RED
3	---------	YELLOW
4	---------	DARK GREEN
5	---------	DARK BROWN
6	---------	BLACK
7	---------	NATURAL
8	---------	ORANGE
9	---------	PINK
10	---------	GREY
11	---------	LIGHT BROWN
12	---------	VIOLET
13	---------	LIGHT GREEN
14	---------	GOLD
15	---------	BEIGE
16	---------	LIGHT BLUE

TUBING TO BE SECURED EVERY 2m METERS LONG RADIUS TURNS TO BE USED TO PREVENT TUBE KINKING.

FINAL TUBE CONNECTIONS TO ANALYSER AND INLINE FILTERS BY CPC(UK)

CONTRACTOR TO TAPE OVER TUBE ENDS TO ENSURE CLEANLINESS OF SYSTEM

FINAL ELECTRICAL CONNECTION BY CPC(UK)

UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

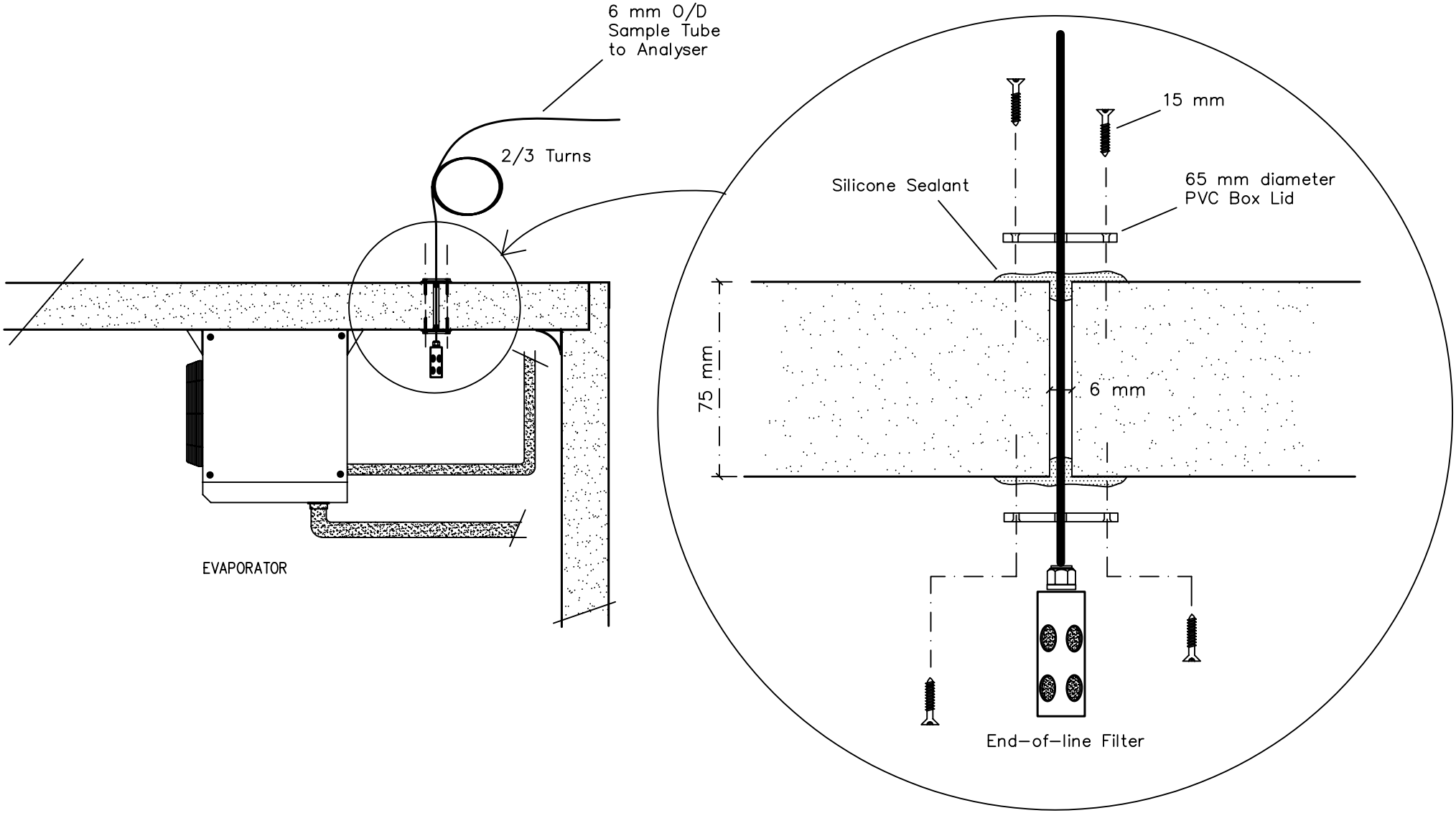
Title
IRLDS Analyser
Tubing arrangement

Drg. No. CPC 80000–05		Revisions
Date 01.04.04	Drn. By ALB	
Checked		

5.3 Packs and Coldrooms

Sampling locations such as compressor packs, receivers, header stations or condensers generally have steel framework surrounding the main components. It is advisable to fix the sample tube and sampling legs to the framework and to clip the end of line filters on the framework supporting the major components.

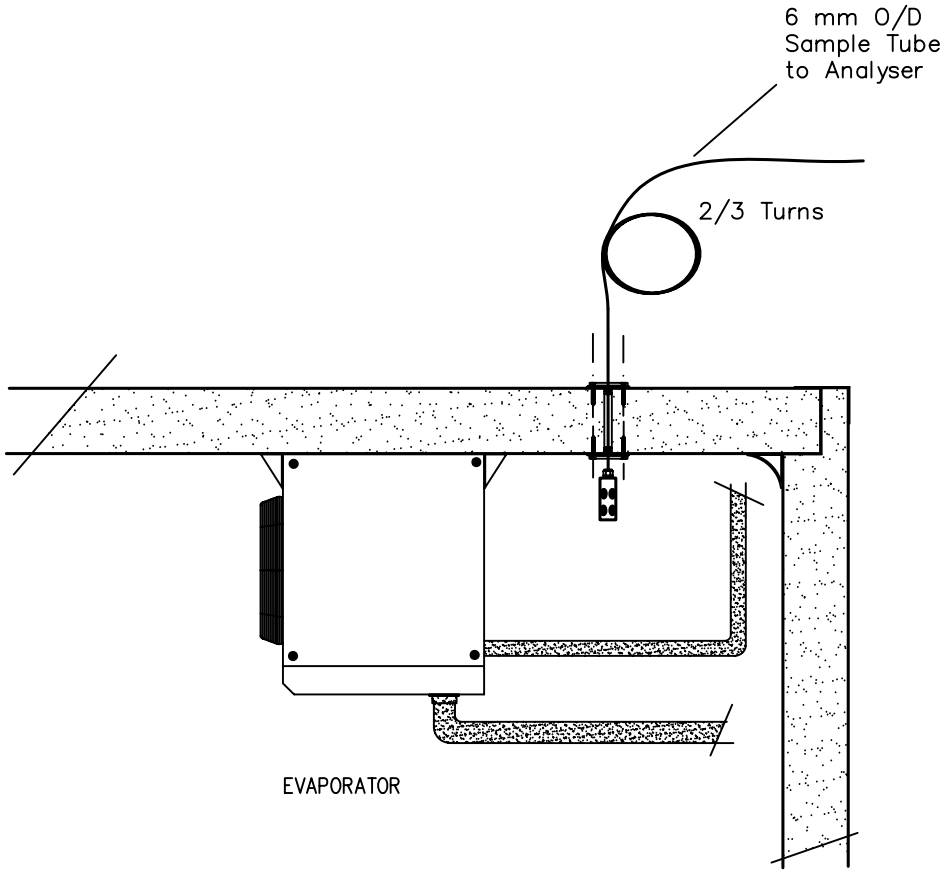
Sample tubes being fitted to coldrooms should be kept to minimum lengths inside the coldrooms to prevent them freezing up. It is recommended that a sampling point is fitted behind each evaporator just below the ceiling (heavier than air gases will rely on the agitation of the air within the room by the evaporator fan to reach the end of line filters). The manifold should be fitted to the main tube run outside the coldroom and a separate leg ran behind each evaporator inside the coldroom. A 6mm hole should be drilled through the coldroom roof just behind the evaporator and through the middle of two plastic conduit stop end box lids. The box lids should then be fitted above and below the hole through the roof, the tube pushed completely through the holes and sealed with silicone sealant.



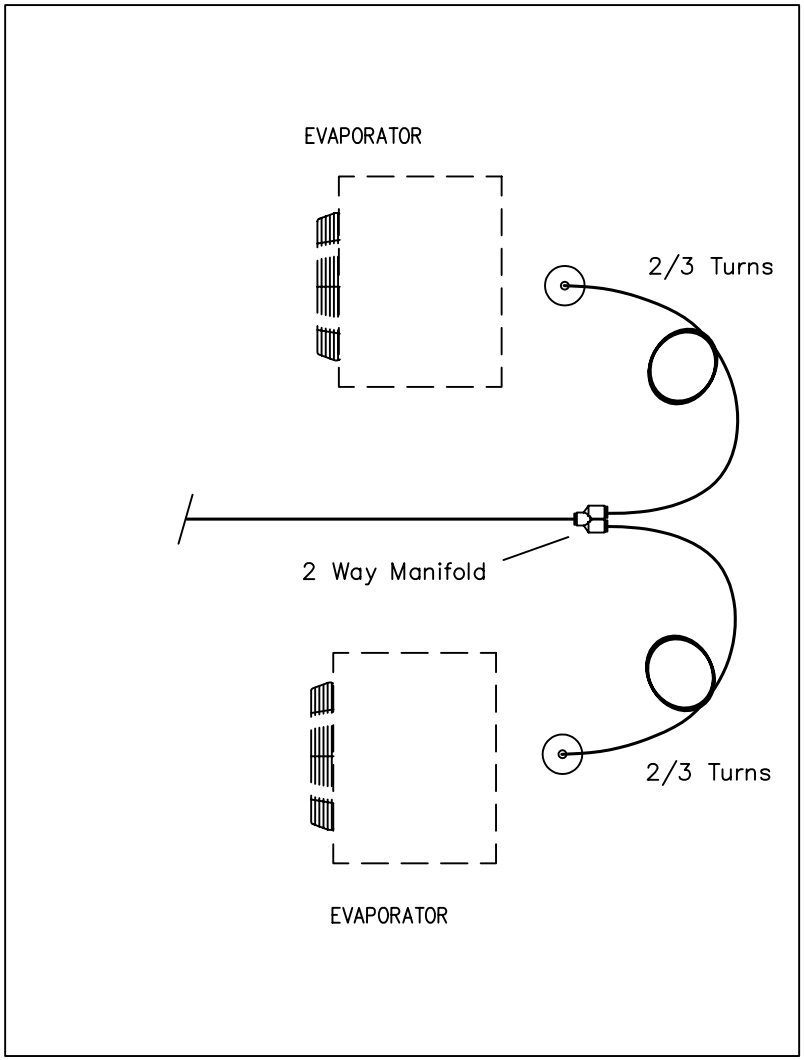
CPC UK
UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Installation in Coldroom (1 of 2)
Site	
Drg. No.	CPC 80000–06
Date	21.04.04
Drn. By	ALB
Checked	

Revisions



SIDE VIEW



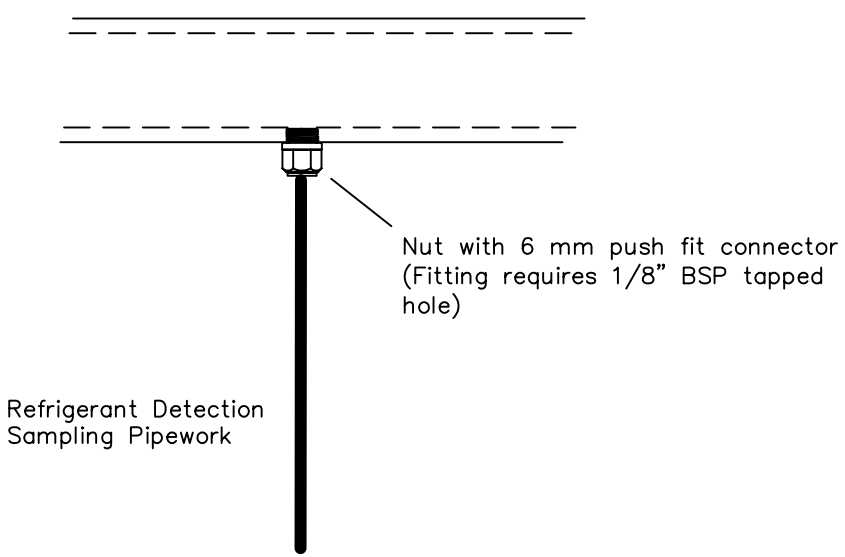
PLANT VIEW

CPC UK
UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

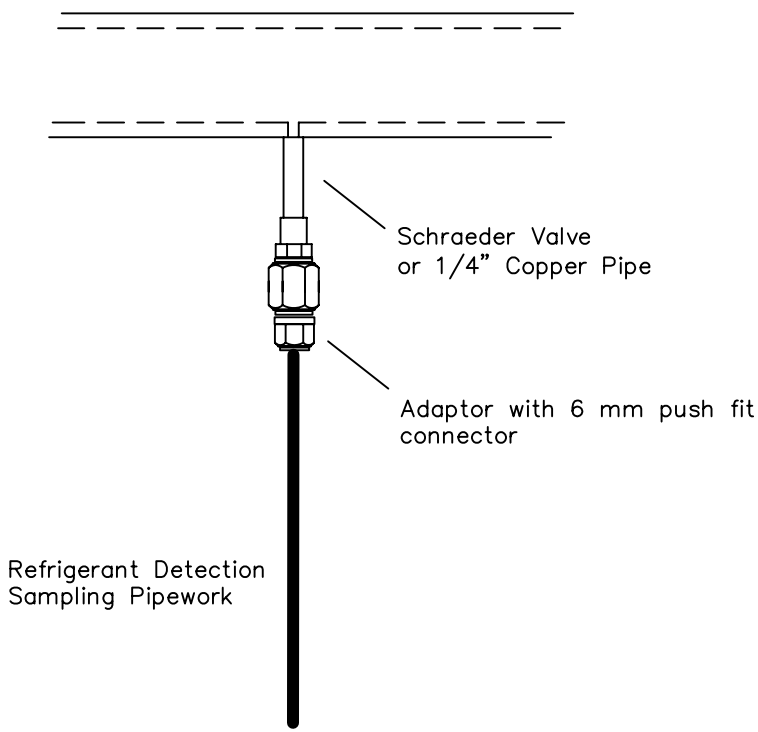
Title	Installation in Coldroom (2 of 2)
Site	
Drg. No.	CPC 80000–07
Date	21.04.04
Drn. By	ALB
Checked	

Revisions

Mild steel Vent Line



Copper Vent Line



UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

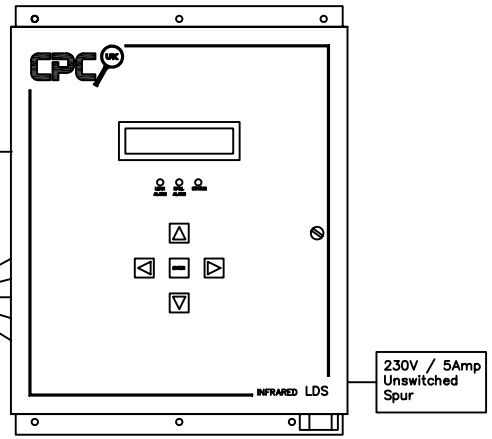
Title	Pressure Relief Vent Line Monitoring
Site	
Drg. No.	CPC 80000–17
Date	01.02.05
Drn. By	ALB
Checked	

Revisions		
2		

5V Output (2 Cores per Beacon)

RS485 Network (Belden 8761)

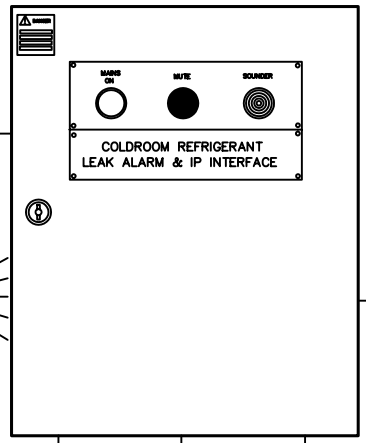
IRLDS – Analyser Panel



Sampling Pipework
8/16 Channels

Coldroom Refrigerant
Leak Alarm Panel

Type 1



Proxy Server

RJ45
Socket

up to 8 Beacons

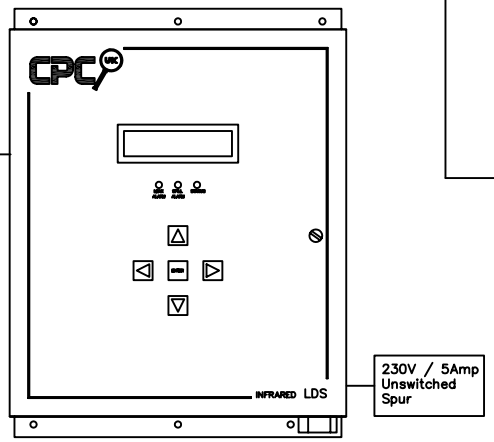
UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Refrigerant Detection Network Diagram
Site	Tesco New Store
Drg. No.	CPC 80000–08
Date	23.02.04
Drn. By	ALB
Checked	

Revisions

RS485 Network (Belden 8761)

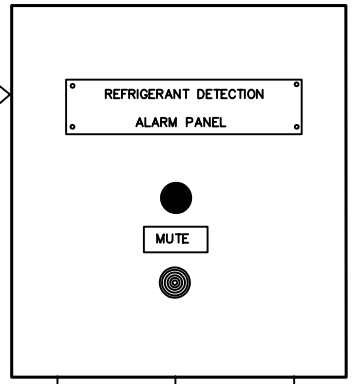
IRLDS - Analyser Panel

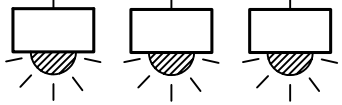


Sampling Pipework
8/16 Channels

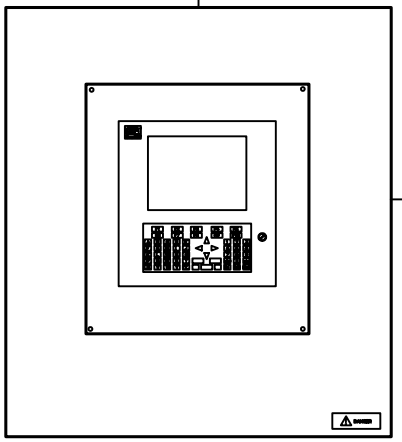
Coldroom Refrigerant
Leak Alarm Panel

Type 2



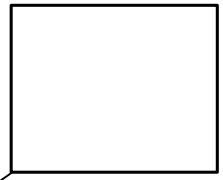


up to 7 Beacons



Einstein Panel

Proxy Server



RJ45
Socket

UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Refrigerant Detection Network Diagram
Site	Tesco Store with Einstein Panel
Drg. No.	CPC 80000-09
Date	24.02.04
Drn. By	ALB
Checked	

Revisions

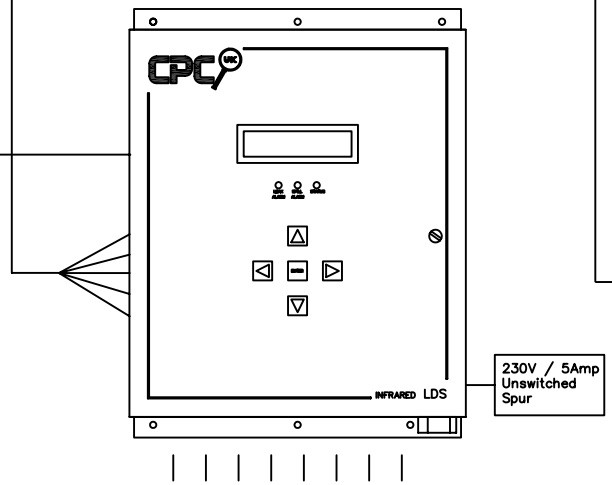
RS485 Network (Belden 8761)

5V Output (2 Cores per Beacon)

Proxy Server

RJ45 Socket

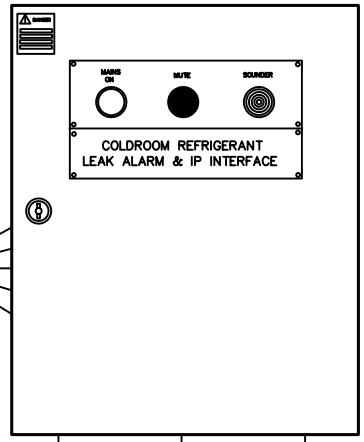
IRLDS - Analyser Panel

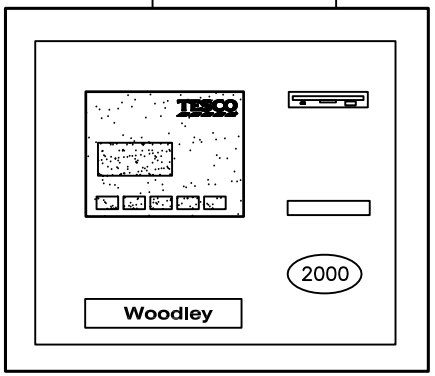


Sampling Pipework
8/16 Channels

Coldroom Refrigerant Leak Alarm Panel

Type 1





Woodley Panel

up to 8 Beacons

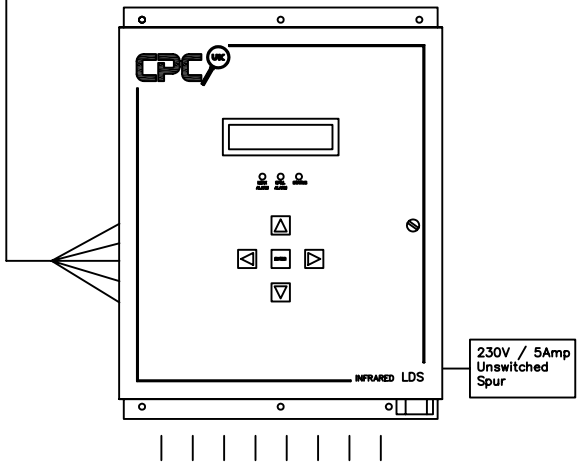
CPC UK
UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Refrigerant Detection Network Diagram
Site	Tesco Store with Woodley Panel
Drg. No.	CPC 80000-10
Date	23.02.04
Drn. By	ALB
Checked	

Revisions

5V Output (2 Cores per Beacon)

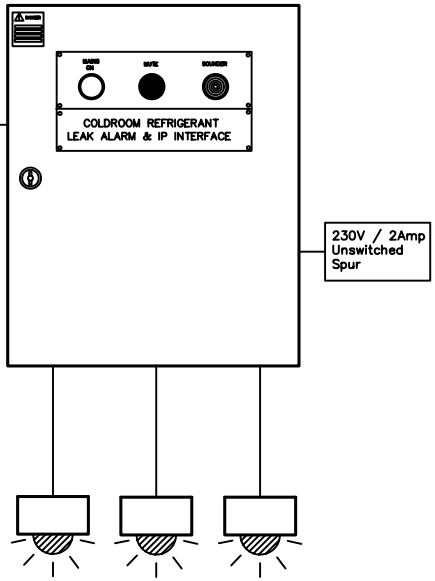
IRLDS - Analyser Panel



Sampling Pipework
8/16 Channels

Coldroom Refrigerant
Leak Alarm Panel

Type 1

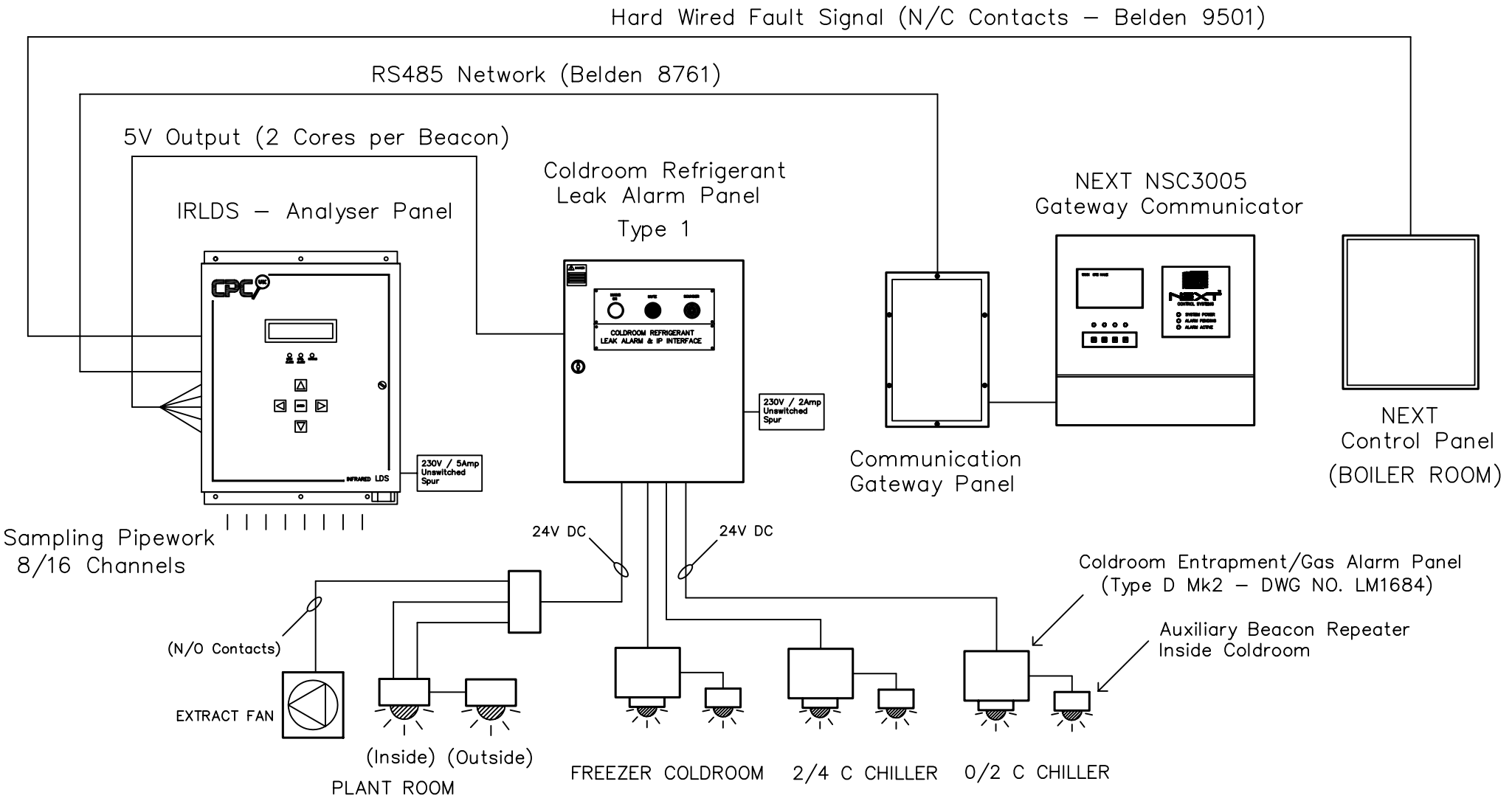


up to 8 Beacons
(24V DC)

CPC UK
UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Refrigerant Detection Network Diagram
Site	Tesco Europe Store
Drg. No.	CPC 80000-11
Date	20.04.04
Drn. By	ALB
Checked	

Revisions



CPC UK

UNITS 7 & 8, HEATHROW CAUSEWAY ESTATE,
ARIEL WAY, HOUNSLOW, MIDDLESEX TW4 6JW
Phone 020 8630 2270 Fax 020 8630 2271

Title	Refrigerant Detection Network Diagram
Site	Waitrose Store
Drg. No.	CPC 80000–12
Date	05.05.04
Drn. By	ALB
Checked	

Revisions